

**CHI MEI**
OPTOELECTRONICS CORP.

Issued Date: Aug. 27, 2002

Model No.: N150X3 - L01

Tentative

TFT LCD Tentative Specification

MODEL NO.: N150X3 - L01

| Liquid Crystal Display Division | | |
|---|---|--|
| QRA Dept. | PDD II Dept. | PD Dept. |
| Approval | Approval | Approval |
|  |  |  |



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**CHI MEI**
OPTOELECTRONICS CORP.Issued Date: Aug. 27, 2002
Model No.: N150X3 - L01**Tentative****REVISION HISTORY**

| Version | Date | Page (New) | Section | Description |
|---------|------------|---------------|---------|---|
| Ver 0.0 | Aug.27,'02 | All | All | Tentative Specification was first issued. |

1. GENERAL DESCRIPTION

1.1 OVERVIEW

N150X3 - L01 is a 15.0" TFT Liquid Crystal Display module with single CCFL Backlight unit and 30 pins LVDS interface. This module supports 1024 x 768 XGA mode and can display 262,144 colors. The optimum viewing angle is at 6 o'clock direction. The inverter module for Backlight is not built in.

1.2 FEATURES

- Thin and Light weight
- XGA (1024 x 768 pixels) resolution
- DE only mode
- 3.3V LVDS (Low Voltage Differential Signaling) interface with 1 pixel/clock

1.3 APPLICATION

- TFT LCD Notebook

1.4 GENERAL SPECIFICATIONS

| Item | Specification | Unit | Note |
|--------------------|---|-------|------|
| Active Area | 304.1 (H) x 228.1 (V) (15.0" diagonal) | mm | (1) |
| Bezel Opening Area | 307.8 (H) x 231.6 (V) | mm | |
| Driver Element | a-si TFT active matrix | - | - |
| Pixel Number | 1024 x R.G.B. x 768 | pixel | - |
| Pixel Pitch | 0.297 (H) x 0.297 (V) | mm | - |
| Pixel Arrangement | RGB vertical stripe | - | - |
| Display Colors | 262,144 | color | - |
| Transmissive Mode | Normally white | - | - |
| Surface Treatment | Hard coating (3H), Anti-glare (Haze 12) | - | - |

1.5 MECHANICAL SPECIFICATIONS

| Item | | Min. | Typ. | Max. | Unit | Note |
|-------------|---------------|-------|-------|-------|------|------|
| Module Size | Horizontal(H) | 316.8 | 317.3 | 317.8 | mm | (1) |
| | Vertical(V) | 241.4 | 241.9 | 242.4 | mm | |
| | Depth(D) | - | 5.7 | 6.0 | mm | |
| Weight | | - | 520 | | g | - |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

| Item | Symbol | Value | | Unit | Note |
|-------------------------------|------------------|-------|------|------|----------|
| | | Min. | Max. | | |
| Storage Temperature | T _{ST} | -20 | +60 | °C | (1) |
| Operating Ambient Temperature | T _{OP} | 0 | +60 | °C | (1), (2) |
| Shock (Non-Operating) | S _{NOP} | - | 200 | G | (3), (5) |
| Vibration (Non-Operating) | V _{NOP} | - | 2.0 | G | (4), (5) |

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. ($T_a \leq 40$ °C).

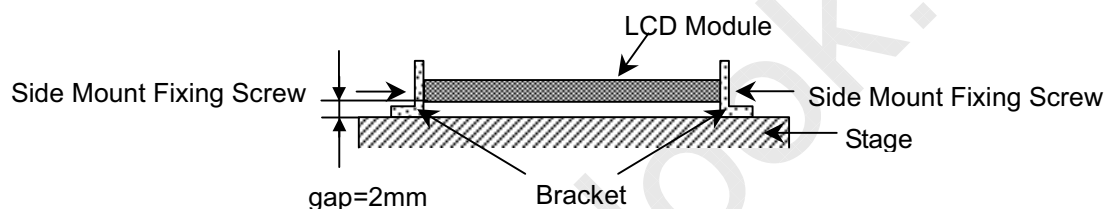
(b) Wet-bulb temperature should be 39 °C Max. ($T_a > 40$ °C).

(c) No condensation.

Note (2) The ambient temperature means the temperature of panel surface.

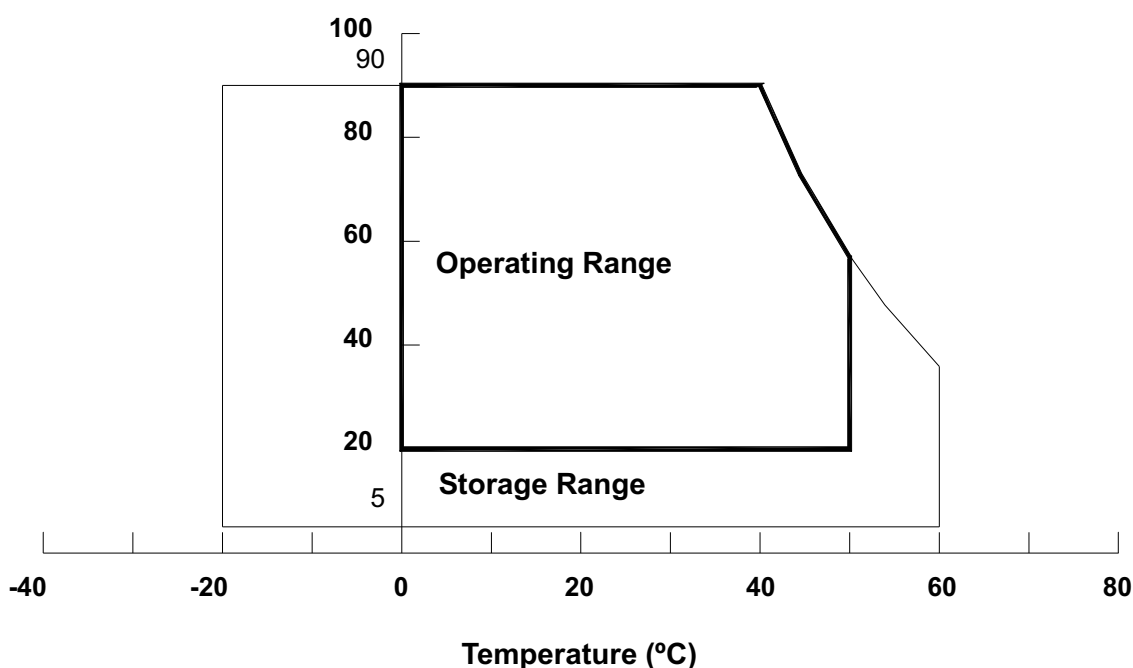
Note (3) 2ms, half sine wave, 1 times for $\pm X$, $\pm Y$, $\pm Z$.

Note (4) 10 ~ 500 Hz, 0.5 Hr/Cycle, (4) cycles each X, Y, Z. The fixing condition is shown as below:



Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

Relative Humidity (%RH)



2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

| Item | Symbol | Value | | Unit | Note |
|----------------------|-----------------|-------|------|------|------|
| | | Min. | Max. | | |
| Power Supply Voltage | V _{CC} | -0.3 | +4.0 | V | (1) |

2.2.2 BACKLIGHT UNIT

| Item | Symbol | Value | | Unit | Note |
|----------------|----------------|-------|--------|-------------------|-----------------------------------|
| | | Min. | Max. | | |
| Lamp Voltage | V _L | - | (2.5K) | V _{RMS} | (1), (2), I _L = 6.5 mA |
| Lamp Current | I _L | - | (7.5) | mA _{RMS} | |
| Lamp Frequency | F _L | - | (80) | KHz | |

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for lamp (Refer to 3.2 for further information).

3. ELECTRICAL CHARACTERISTICS

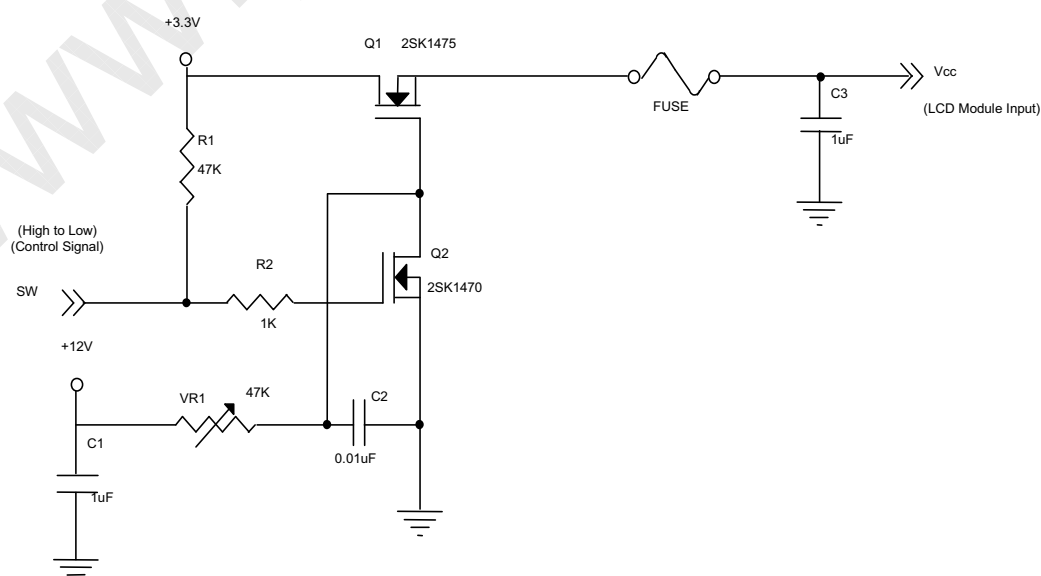
3.1 TFT LCD MODULE

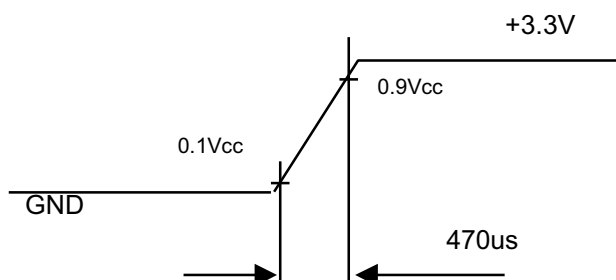
T_a = 25 ± 2 °C

| Parameter | | Symbol | Value | | | Unit | Note |
|-----------------------|-----------|-------------------|-------|------|-------|------|------|
| | | | Min. | Typ. | Max. | | |
| Power Supply Voltage | | V _{CC} | 3.0 | 3.3 | 3.6 | V | - |
| Ripple Voltage | | V _{RP} | - | (50) | | mV | - |
| Rush Current | | I _{RUSH} | - | | (1.5) | A | (2) |
| Power Supply Current | White | I _{CC} | - | TBD | | mA | (3)a |
| | Black | | - | TBD | | mA | (3)b |
| Logical Input Voltage | "H" Level | V _{IL} | - | - | +100 | mV | - |
| | "L" Level | V _{IH} | -100 | - | - | mV | - |
| Terminating Resistor | | R _T | - | 100 | - | Ohm | - |

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:



Vcc rising time is 470us

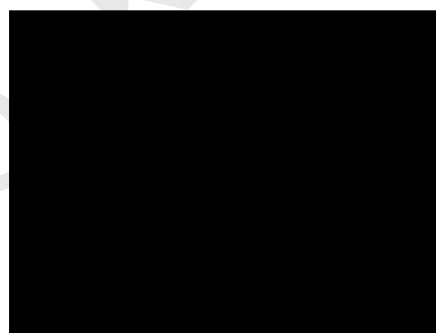
Note (3) The specified power supply current is under the conditions at $V_{cc} = 3.3\text{ V}$, $T_a = 25 \pm 2\text{ }^\circ\text{C}$, $f_v = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern

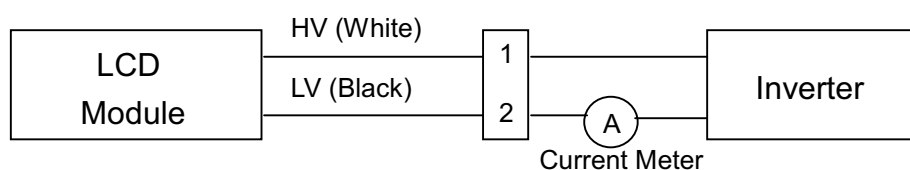


Active Area

3.2 BACKLIGHT UNIT $T_a = 25 \pm 2\text{ }^\circ\text{C}$

| Parameter | Symbol | Value | | | Unit | Note |
|----------------------|----------|--------|-------|-------------------------------|-------------------|------------------------------|
| | | Min. | Typ. | Max. | | |
| Lamp Input Voltage | V_L | | (675) | | V_{RMS} | $I_L = 6.5\text{ mA}$ |
| Lamp Current | I_L | (2.0) | (6.5) | (7.0) | mA_{RMS} | (1) |
| Lamp Turn On Voltage | V_s | - | | (1100) (25 $^\circ\text{C}$) | V_{RMS} | (2) |
| | | - | | (1300) (0 $^\circ\text{C}$) | V_{RMS} | (2) |
| Operating Frequency | F_L | (40) | (50) | (67) | KHz | (3) |
| Lamp Life Time | L_{BL} | 10,000 | | - | Hrs | (5) |
| Power Consumption | P_L | - | (4.4) | - | W | (4), $I_L = (6.5)\text{ mA}$ |

Note (1) Lamp current is measured by utilizing a high frequency current meter as shown below:



Note (2) The voltage shown above should be applied to the lamp for more than 1 second after startup.

Otherwise the lamp may not be turned on.

Note (3) The lamp frequency may produce interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (4) $P_L = I_L \times V_L$

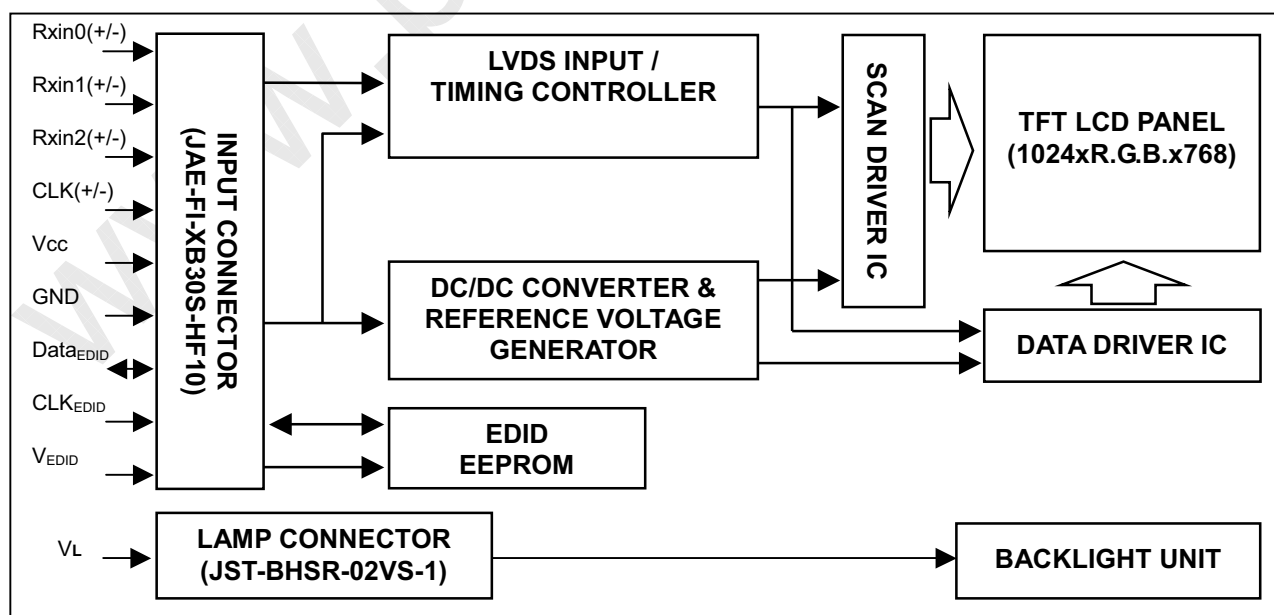
Note (5) The lifetime of lamp can be defined as the time in which it continues to operate under the condition $T_a = 25 \pm 2^\circ\text{C}$ and $I_L = 6.5 \text{ mArms}$ until one of the following events occurs:

- (a) When the brightness becomes or lower than 50% of its original value.
- (b) When the effective ignition length becomes or lower than 80% of its original value. (Effective ignition length is defined as an area that has less than 70% brightness compared to the brightness in the center point.)

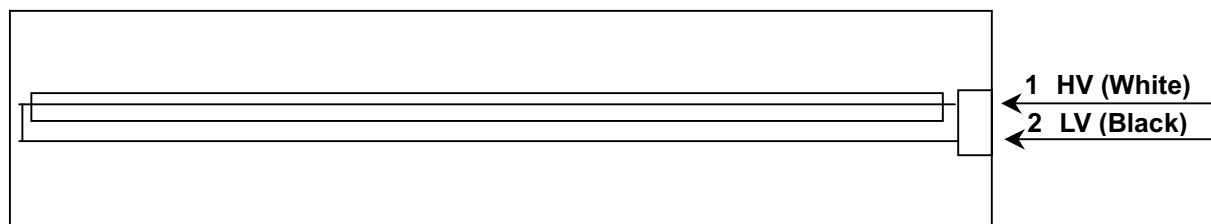
Note (6) The waveform of the voltage output of inverter must be area-symmetric and the design of the inverter must have specifications for the modularized lamp. The performance of the Backlight, such as lifetime or brightness, is greatly influenced by the characteristics of the DC-AC inverter for the lamp. All the parameters of an inverter should be carefully designed to avoid producing too much current leakage from high voltage output of the inverter. When designing or ordering the inverter please make sure that a poor lighting caused by the mismatch of the Backlight and the inverter (miss-lighting, flicker, etc.) never occurs. If the above situation is confirmed, the module should be operated in the same manners when it is installed in your instrument.

4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



4.2 BACKLIGHT UNIT



5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

| Pin | Symbol | Description | Polarity | Remark |
|-----|----------------------|-------------------------------|----------|----------------------|
| 1 | Vss | Ground | | |
| 2 | Vcc | Power Supply +3.3 V (typical) | | |
| 3 | Vcc | Power Supply +3.3 V (typical) | | |
| 4 | V _{EDID} | DDC 3.3V Power | | |
| 5 | NC | Non-Connection | | |
| 6 | CLK _{EDID} | DDC Clock | | |
| 7 | DATA _{EDID} | DDC Data | | - |
| 8 | Rxin0- | LVDS Differential Data Input | Negative | R0~R5,G0 |
| 9 | Rxin0+ | LVDS Differential Data Input | Positive | - |
| 10 | Vss | Ground | | |
| 11 | Rxin1- | LVDS Differential Data Input | Negative | G1~G5,B0,B1 |
| 12 | Rxin1+ | LVDS Differential Data Input | Positive | - |
| 13 | Vss | Ground | | |
| 14 | Rxin2- | LVDS Differential Data Input | Negative | B2~B5,DE,Hsync,Vsync |
| 15 | Rxin2+ | LVDS Differential Data Input | Positive | |
| 16 | Vss | Ground | | |
| 17 | CLK- | LVDS Clock Data Input | Negative | LVDS Level |
| 18 | CLK+ | LVDS Clock Data Input | Positive | |
| 19 | Vss | Ground | | |
| 20 | NC | Non-Connection | | |
| 21 | NC | Non-Connection | | |
| 22 | Vss | Ground | | |
| 23 | NC | Non-Connection | | |
| 24 | NC | Non-Connection | | |
| 25 | Vss | Ground | | |
| 26 | NC | Non-Connection | | |
| 27 | NC | Non-Connection | | |
| 28 | Vss | Ground | | |
| 29 | NC | Non-Connection | | |
| 30 | NC | Non-Connection | | |

Note (1) Connector Part No.: JAE-FI-XB30S-HF10 or equivalent

Note (2) User's connector Part No: FI-X30M or equivalent

Note (3) The first pixel is even.

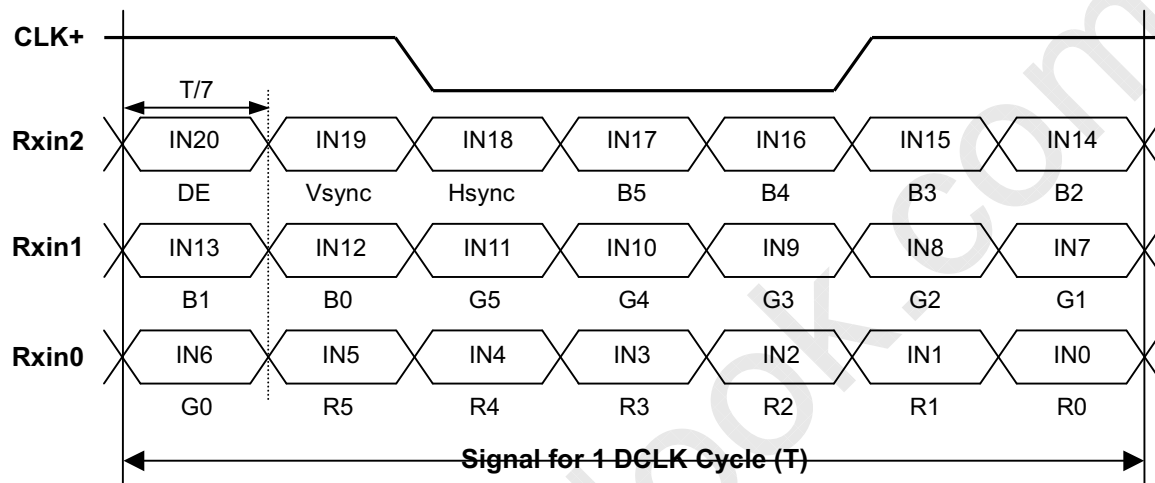
5.2 BACKLIGHT UNIT

| Pin | Symbol | Description | Color |
|-----|--------|--------------|-------|
| 1 | HV | High Voltage | White |
| 2 | LV | Ground | Black |

Note (1) Connector Part No.: JST-FI-XB30S-HF10 or equivalent

Note (2) User's connector Part No.: SM02B-BHSS-1-TB or equivalent

5.3 TIMING DIAGRAM OF LVDS INPUT SIGNAL



5.4 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

| Color | | Data Signal | | | | | | | | | | | | | | | | | |
|-------------------|-------------|-------------|----|----|----|----|----|-------|----|----|----|----|----|------|----|----|----|----|----|
| | | Red | | | | | | Green | | | | | | Blue | | | | | |
| | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Colors | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gray Scale Of Red | Red(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(1) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(2) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(61) | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(62) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(63) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | | |
|---------------------|---------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gray Scale Of Green | Green(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(61) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(62) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gray Scale Of Blue | Green(63) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Blue(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue(61) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| | Blue(62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| | Blue(63) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Note (1) 0: Low Level Voltage, 1: High Level Voltage

6. INTERFACE TIMING

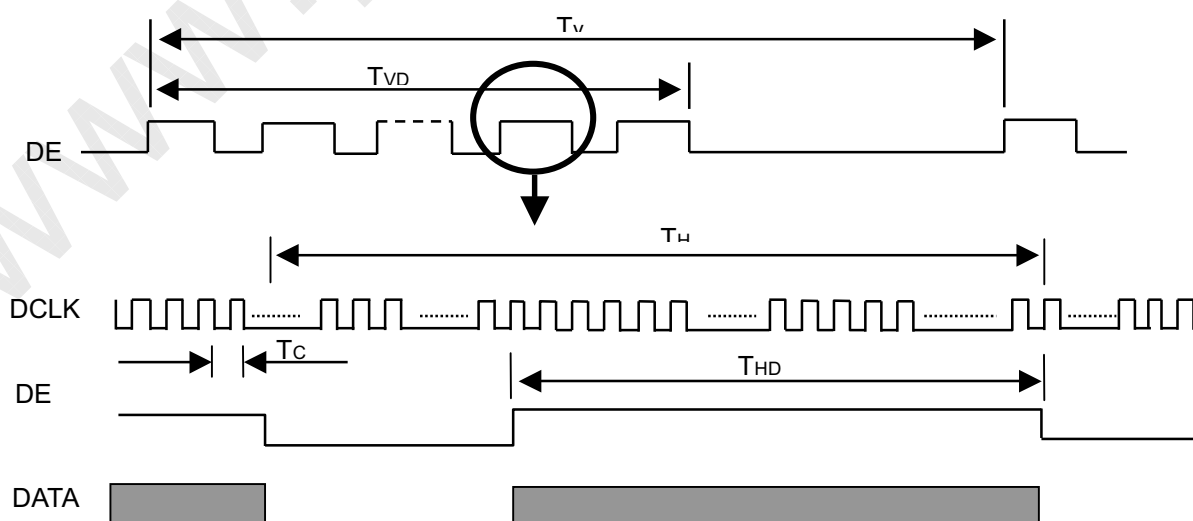
6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

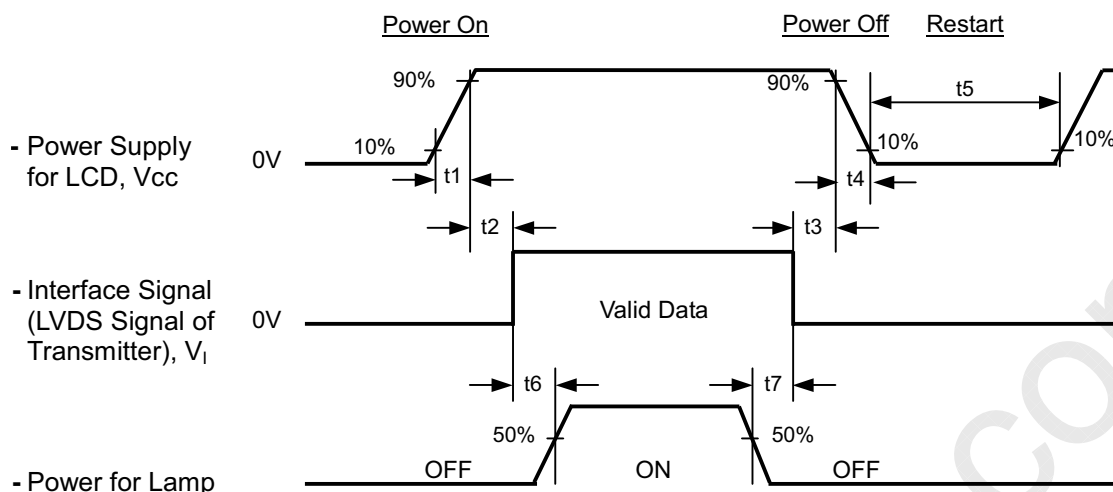
| Signal | Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|--------|----------------------------------|--------|--------|------|--------|------|------|
| DCLK | Frequency | 1/Tc | 20 | 65 | (68) | MHz | - |
| DE | Frame Time Cycle | TV | (771) | 806 | (850) | TH | - |
| | Vertical Active Display Period | TVD | 768 | 768 | 768 | TH | - |
| | One Line Scanning Time Cycle | TH | (1200) | 1344 | (1600) | Tc | - |
| | Horizontal Active Display Period | THD | 1024 | 1024 | 1024 | Tc | - |

Note (1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

INPUT SIGNAL TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE



Timing Specifications:

- $0 < t1 \leq (10) \text{ msec}$
- $0 < t2 \leq (50) \text{ msec}$
- $0 < t3 \leq (50) \text{ msec}$
- $0 < t4 \leq (50) \text{ msec (given by system)}$
- $0 < t4 \leq (400) \text{ msec (measured on TFT-LCD module)}$
- $t5 \geq (500) \text{ msec}$
- $t6 \geq 200 \text{ msec}$
- $t7 \geq 200 \text{ msec}$

Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD V_{cc} to 0 V.

Note (3) The Backlight inverter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight inverter power must be turned off before the power supply for the logic and the interface signal is invalid.

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

| Item | Symbol | Value | Unit |
|----------------------------|---|-------|------|
| Ambient Temperature | Ta | 25±2 | °C |
| Ambient Humidity | Ha | 50±10 | %RH |
| Supply Voltage | V _{CC} | 3.3 | V |
| Input Signal | According to typical value in "3. ELECTRICAL CHARACTERISTICS" | | |
| Inverter Current | I _L | (6.5) | mA |
| Inverter Driving Frequency | F _L | (50) | KHz |
| Inverter | TBD | | |

The relative measurement methods of optical characteristics are shown in 6.2. The following items should be measured under the test conditions described in 6.1 and stable environment shown in Note (6).

7.2 OPTICAL SPECIFICATIONS

| Item | | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|----------------------------|------------|------------------|--|------|---------|-------|-------------------|----------|
| Contrast Ratio | | CR | $\theta_x=0^\circ, \theta_Y=0^\circ$ Viewing Normal Angle | - | (250) | - | - | (2), (6) |
| Response Time | | T _R | | - | (15) | | ms | (3) |
| | | T _F | | - | (35) | | ms | |
| Average Luminance of White | | L _{AVE} | | | (170) | - | cd/m ² | (4), (6) |
| White Variation | | δW | | - | - | (1.4) | - | (6), (7) |
| Cross Talk | | CT | | - | - | (3.0) | % | (5), (6) |
| Color Chromaticity | Red | R _x | | | TBD | | - | (1), (6) |
| | | R _y | | | TBD | | - | |
| | Green | G _x | | | TBD | | - | |
| | | G _y | | | TBD | | - | |
| | Blue | B _x | | | TBD | | - | |
| | | B _y | | | TBD | | - | |
| | White | W _x | | | (0.310) | | - | |
| | | W _y | | | (0.330) | | - | |
| Viewing Angle | Horizontal | θ _x + | CR≥10 | (40) | (45) | Deg. | | |
| | | θ _x - | | (40) | (45) | | | |
| | Vertical | θ _y + | | (10) | (15) | | | |
| | | θ _y - | | (30) | (35) | | | |

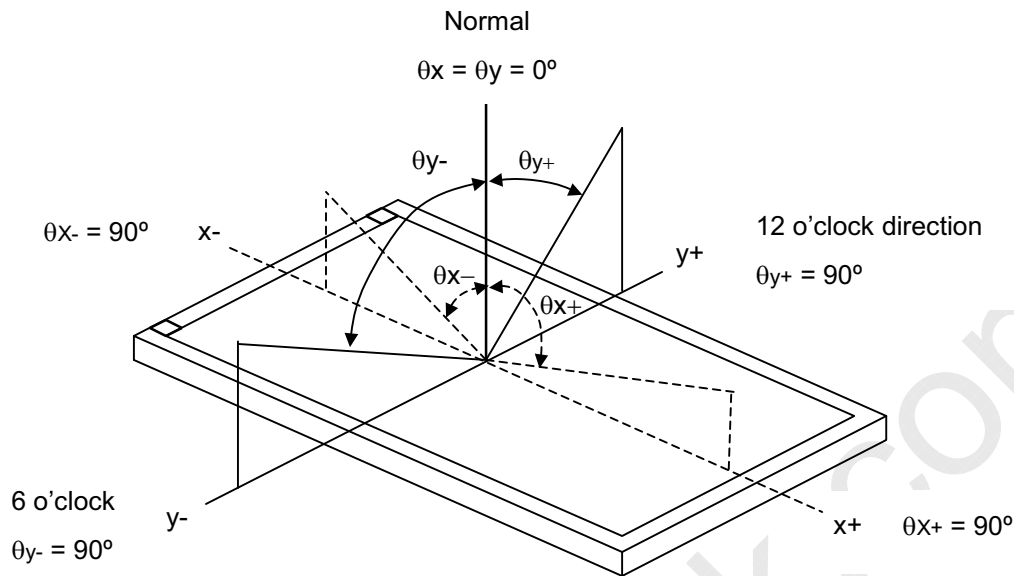


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OPTOELECTRONICS CORP.

Issued Date: Aug. 27, 2002
Model No.: N150X3 - L01

Tentative

Note (1) Definition of Viewing Angle (θ_x , θ_y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

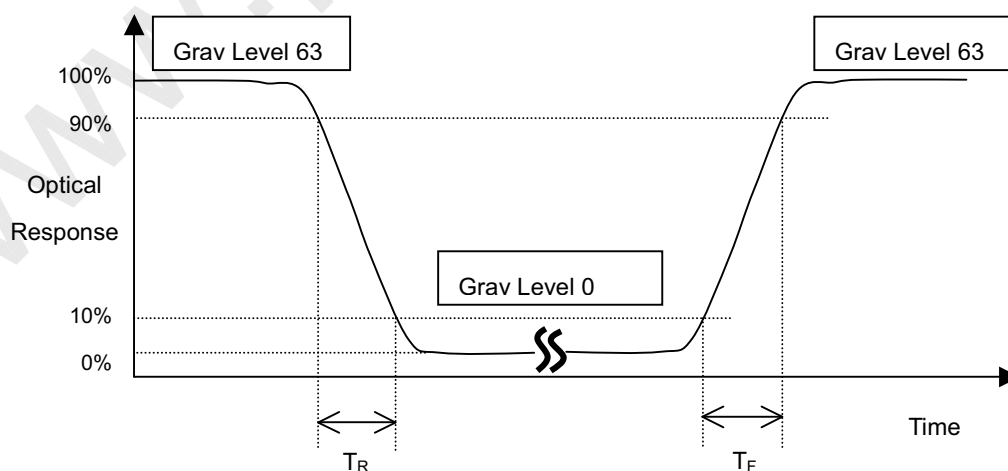
L_{63} : Luminance of gray level 63

L_0 : Luminance of gray level 0

$$CR = CR(5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (7).

Note (3) Definition of Response Time (T_R , T_F):



Note (4) Definition of Average Luminance of White (L_{AVE}):

Measure the luminance of gray level 63 at 5 points

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (7).

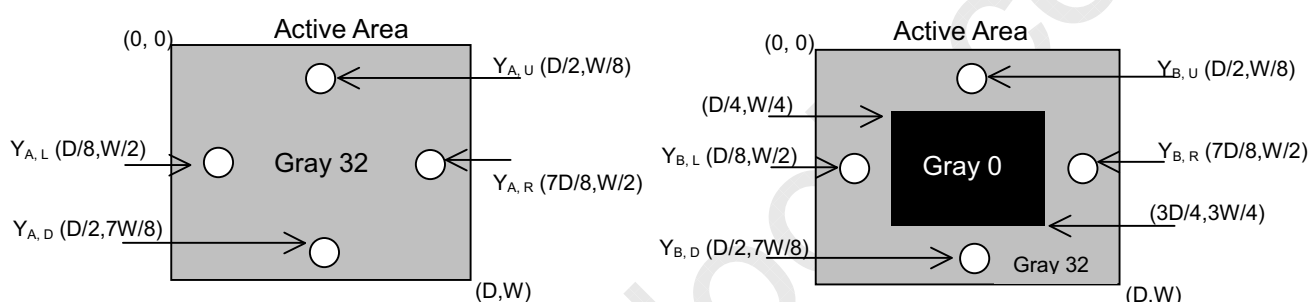
Note (5) Definition of Cross Talk (CT):

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where:

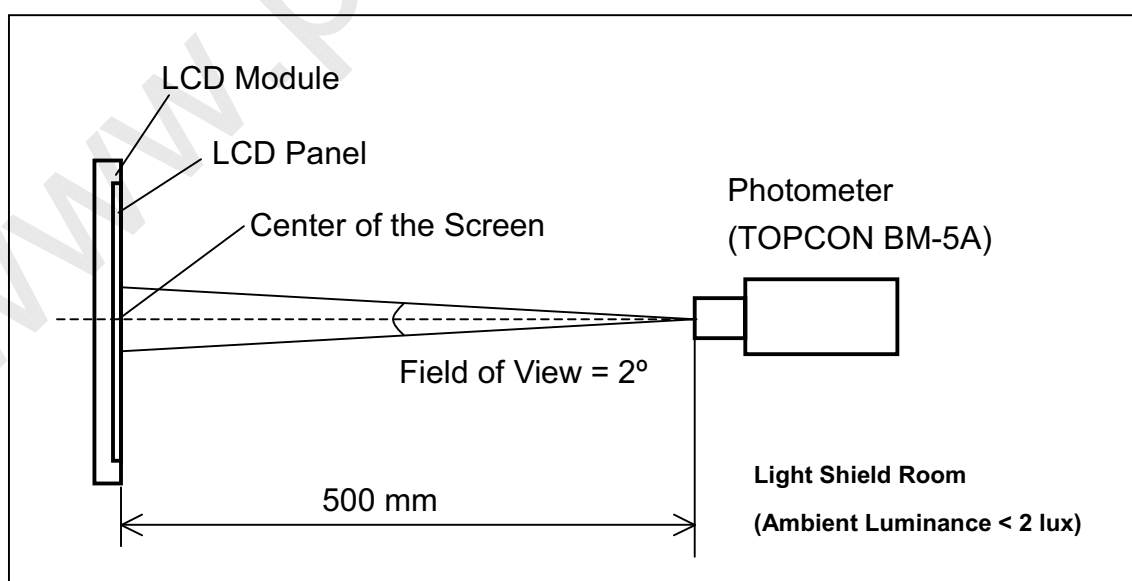
Y_A = Luminance of measured location without gray level 0 pattern (cd/m^2)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m^2)



Note (6) Measurement Setup:

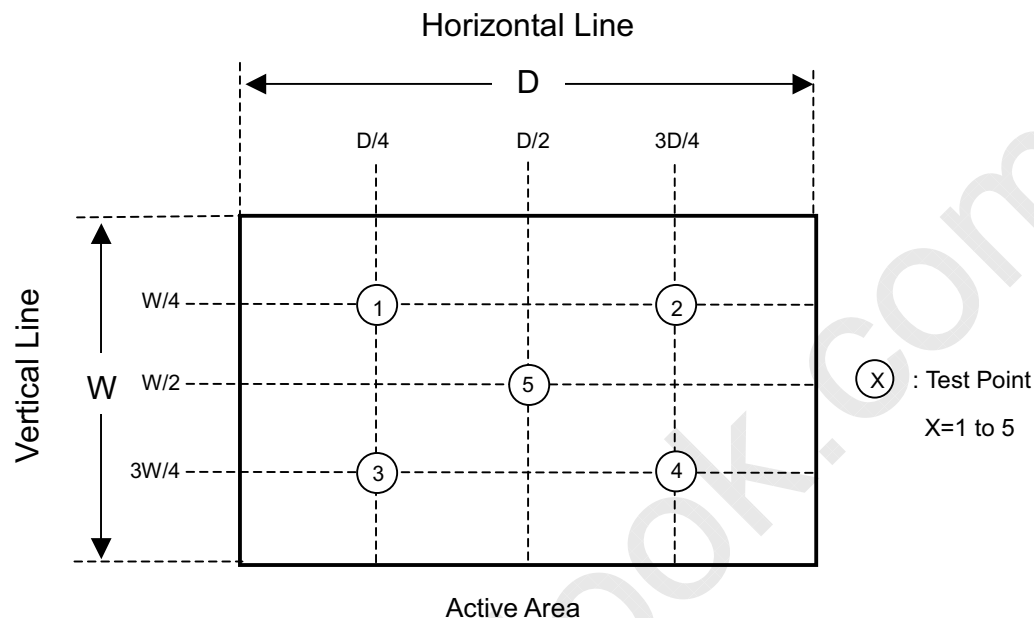
The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



Note (7) Definition of White Variation (δW):

Measure the luminance of gray level 63 at 5 points

$$\delta W = \text{Maximum [L (1), L (2), L (3), L (4), L (5)] / Minimum [L (1), L (2), L (3), L (4), L (5)]}$$



8. PRECAUTIONS

8.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- (4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- (5) Do not pull the I/F connector in or out while the module is operating.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- (9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (10) When ambient temperature is lower than 10°C may reduce the display quality. For example, the response time will become slowly, and the starting voltage of CCFL will be higher than room temperature.

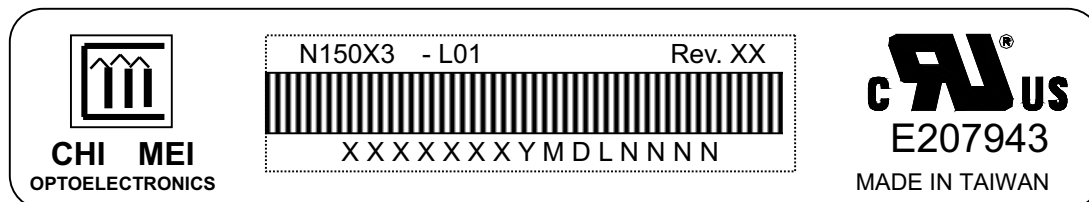
8.2 SAFETY PRECAUTIONS

- (1) The startup voltage of Backlight is approximately 1000 Volts. It may cause electrical shock while assembling with inverter. Do not disassemble the module or insert anything into the Backlight unit.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.

9. DEFINITION OF LABELS

9.1 CMO MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Model Name: N150X3 - L01

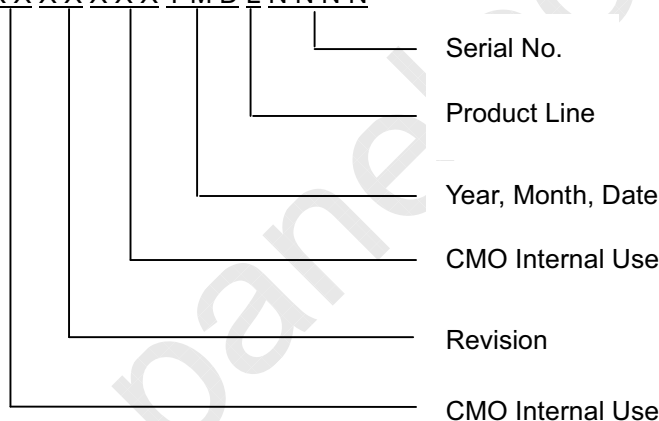
(b) Revision: Rev. XX: WS : A1, A2, A3,..., etc.

ES : B1, B2, B3,..., etc.

CS & MP : C1, C2, C3,...,etc.

Note: It will happen that revision code changed without product changed in developing duration because of CMO internal stage change, for example: AX → B1, BX → C1.

(c) Serial ID: XXXXXXYMDLNNNN



Serial ID includes the information as below:

(a) Manufactured Date: Year: 0 ~ 9, for 2000 ~ 2009.

Month: 1 ~ 9, A ~ C, for Jan. ~ Dec.

Day: 1 ~ 9, A ~ Y, for 1st to 31st, exclude I, O and U.

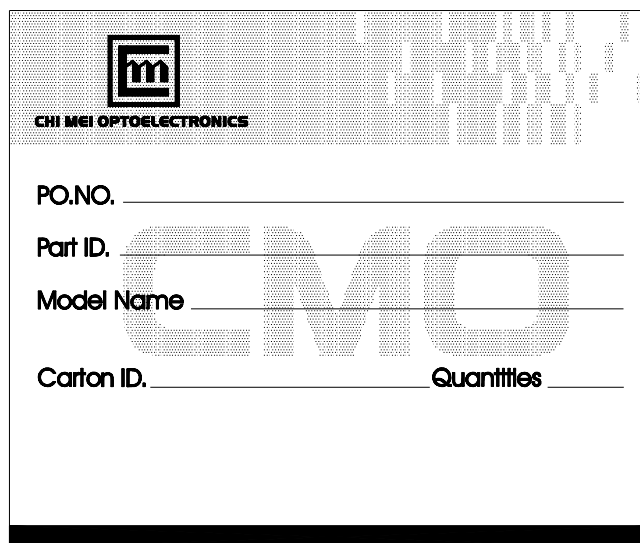
(b) Revision Code: cover all the changes.

(c) Serial No.: Manufacturing sequence of product.

(d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.



9.2 CMO CARTON LABEL



The image shows a template for a CMO (Carton Manufacturer Organization) label. It features a header with the CHI MEI OPTOELECTRONICS logo and name. Below the header, there are four lines of text for labeling: PO.NO., Part ID., Model Name, and Carton ID. The label is designed to be printed on a carton, with a large 'CMO' watermark visible in the background. The label is framed by a black border.

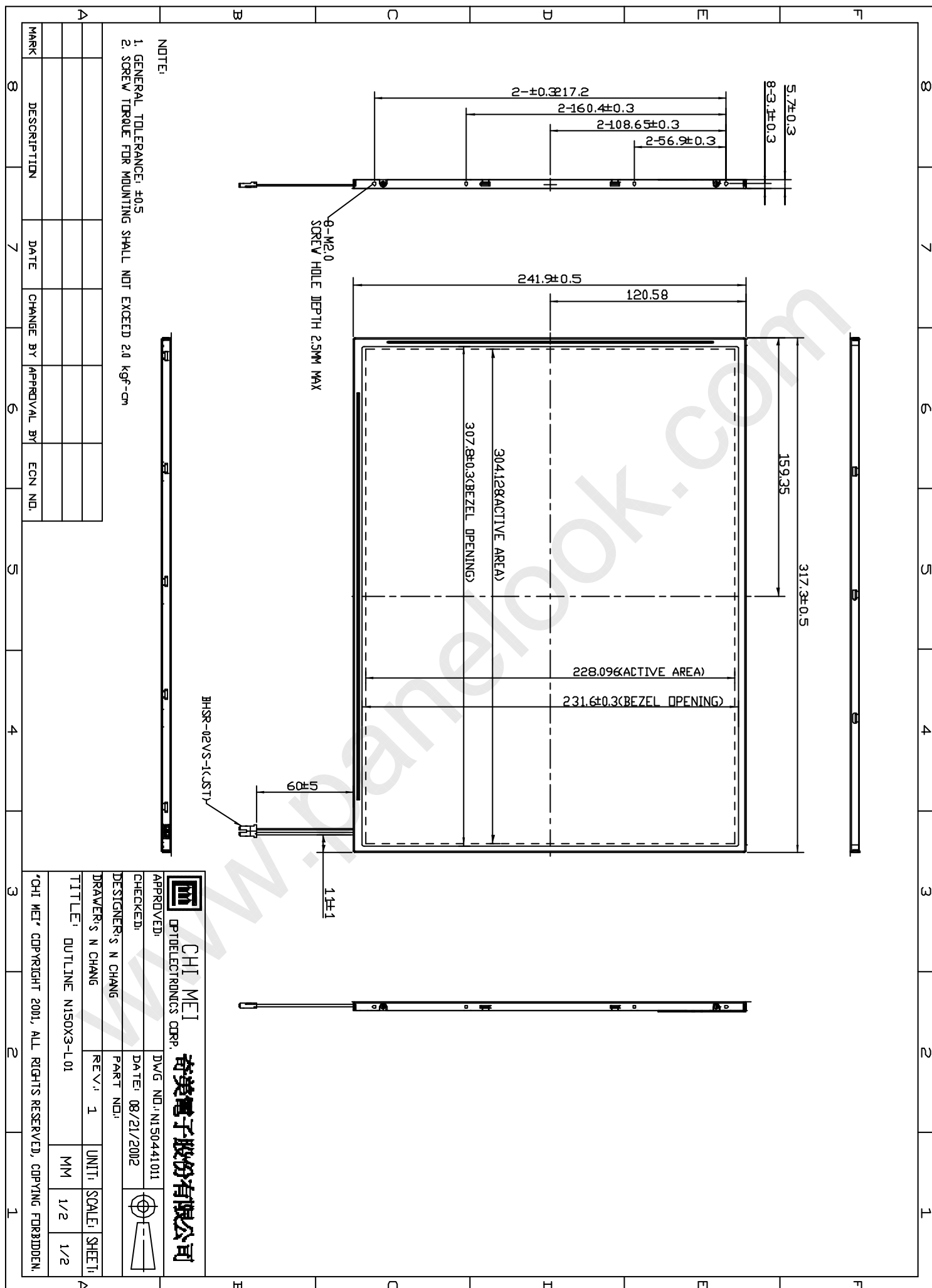
CHI MEI OPTOELECTRONICS

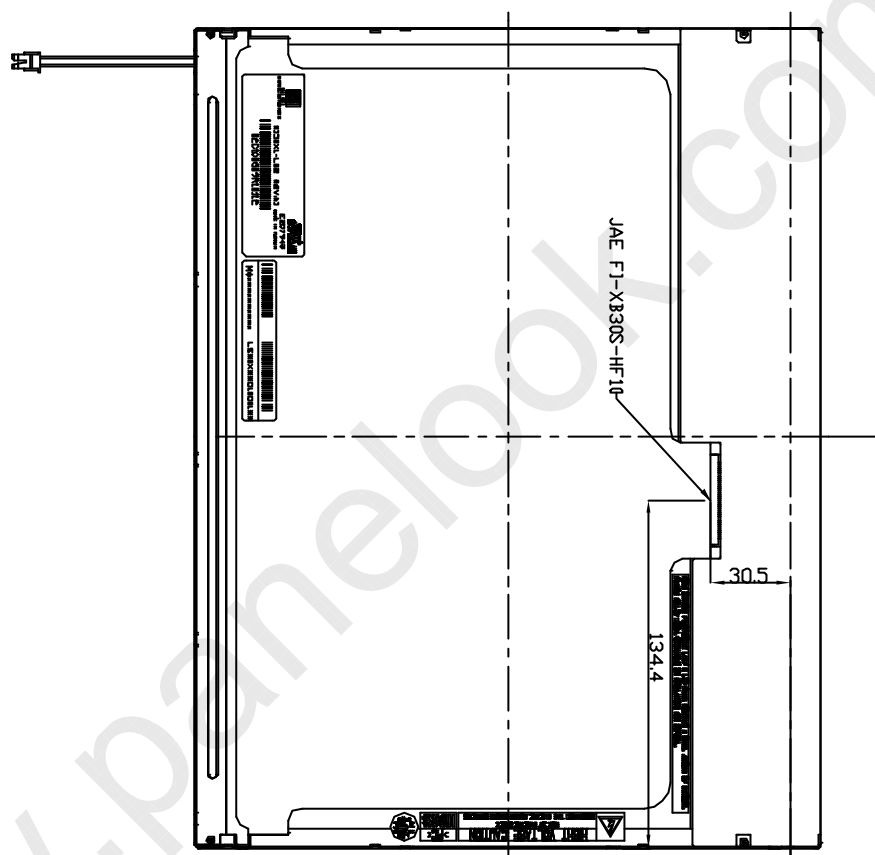
PO.NO. _____

Part ID. _____



Model Name _____

Carton ID. _____ Quantities _____





| MARK | DESCRIPTION | DATE | CHANGE BY | APPROVAL BY | ECN NO. |
|------|-------------|------|-----------|-------------|---------|
| | | | | | |
| | | | | | |
| | | | | | |

| | | | | | | | | | | | |
|---|--------------------|--|--|----------------------------------|------------|-------|-----|---|--------|--------|--|
|  | | | | CHI MEI OPTOELECTRONICS CORP. | | | | 奇美電子股份有限公司 | | | |
| APPROVED: | | | | DWG NO.: | NI50441011 | | |  | | | |
| CHECKED: | | | | DATE: | 08/21/2002 | | | | | | |
| DESIGNER'S | N CHANG | | | PART NO.: | | | | | | | |
| DRAWER'S | N CHANG | | | REV.: | 1 | UNIT: | | | SCALE: | SHEET: | |
| TITLE: | OUTLINE NI50X3-L01 | | | | | M/M | 1/2 | 2/2 | | | |
| *CHI MEI' COPYRIGHT 2001, ALL RIGHTS RESERVED, COPYING FORBIDDEN. | | | | | | | | | | | |